

REMARKS

At the outset, the Examiner is thanked for the thorough review and consideration of the pending application. The Office Action dated March 24, 2006, has been received and its contents carefully reviewed.

Claims 1-25 are rejected by the Examiner. Claims 1-25 remain pending in this application.

In the Office Action, claims 1, 2, 7, 10, 11, 13, 14, 17-22, 25 and 26 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 3,532,568 to Schutt (hereinafter "Schutt") in view of U.S. Patent No. 5,000,795 to Chung et al. (hereinafter "Chung"), U.S. Patent No. 4,338,157 to Kanda (hereinafter "Kanda"), and Allies and U.S. Patent No. 5,560,838 to Victoria et al. (hereinafter "Victoria"). Claims 3-6, 8, 9, 12, 15, 23 and 24 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Schutt in view of Chung, Kanda, and Allies, Victoria, and further in view of U.S. Patent No. 3,869,313 to Jones et al. (hereinafter "Jones"). Claim 16 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Schutt in view of Chung, Kanda, and Allies, Victoria, and further in view of U.S. Patent No. 4,886,590 to Tittle (hereinafter "Tittle").

Applicants note that the present Office Action is in response to an Appeal Brief filed on January 6, 2006. The Office Action states that prosecution is reopened and that a new ground of rejection is set forth in the Office Action. Upon careful review of the Office Action, it is noted that the current rejection of claims 1, 2, 7, 10, 11, 14, 17-22, 25, and 26 is nearly identical to the rejection of these claims in Final Rejection mailed April 8, 2005. The differences relate to replacing the previous primary reference Nelson with a new primary reference Schutt. So specific references to Nelson and elements in Nelson have been simply changed to specific references to Schutt and elements in Schutt. Some additional language, totaling about two sentences, in the previous Final Rejection was also removed from the present rejection. So it would seem to the applicants, that if the arguments in the Appeal Brief overcame the previous rejection, how simply swapping primary references and making the same exact arguments changes anything. Applicants respectfully assert that if the previous arguments overcame Nelson and the other art cited, that the same arguments overcome Schutt as currently cited and the other

art cited. The Examiner has not provided a substantively new argument, hence the currently pending claims are allowable over Schutt and the other cited art.

Therefore, Applicants repeat arguments made in the Appeal Brief below, with some additional arguments relating to the fact that none of the references teach an apparatus that etches a glass substrate to uniformly reduce the thickness of the glass substrate and that the bubble plate of Chung relates to the cleaning of semiconductor wafers rather than the etching of glass substrates.

In order to support a rejection under 35 U.S.C. §103(a), the Action must establish a *prima facie* case of obviousness. To establish a *prima facie* case of obviousness three criteria must be met. First, there must be some motivation or suggestion to combine the applied references. Second, there must be a reasonable expectation of success. Finally, the combination must teach each and every claimed element. In the present case, claims 1, 2, 7, 10, 11, 13, 14, 17-22, 25 and 26 are not rendered unpatentable over the combination of Schutt, Chung, Kanda, and Allies because the Examiner fails to establish a *prima facie* case of obviousness as discussed below.

Independent claim 1 defines an etching apparatus for etching a glass substrate. The apparatus includes, *inter alia*, “a first tank including a first etchant,” “an etch bath having a bubble plate, the glass substrate immersed in the first etchant and the etch bath connected to the first tank and receiving the first etchant, the etch bath containing a residual etchant including a diluted etchant and residue material after the glass substrate is etched with the first etchant, wherein a thickness of the glass substrate is uniformly reduced,” and “a control unit controlling the first tank, the etch bath and the second tank, the control unit terminating the etching when a temperature of the first etchant reaches a termination temperature.”

In rejecting claim 1, the Examiner asserts that Schutt discloses all of the claimed elements except an etch bath including a bubble plate and etching a glass substrate by immersion therein. The Examiner cites Schutt as “chemically etching (“etching zone 1”; Sole figure) material from a substrate (copper, abstract).” So Schutt does not teach a an etch bath that etches a glass substrate to uniformly reduce the thickness of the glass substrate. Rather, Schutt is directed to etching copper from off of a substrate, specifically a printed circuit board. Such a process is typically intended to form conductive patterns on the printed circuit board. Hence, etching a material uniformly to reduce its thickness is completely counter to the goal of Schutt.

Accordingly, Schutt and the other cited references fail to teach every feature of the claimed invention.

The Examiner asserts that it would have been obvious to one skilled in the art to replace the etching zone 1 of Schutt with the etch bath and bubble plate of Chung. This assertion is unfounded for the following reasons. The Examiner asserts that the motivation to replace the etchant delivery means with the an etch bath including a bubble plate “would be to replace the etchant delivery means with an alternate and equivalent etching means,” however the Examiner fails to provide any evidence of the desirability of combining Schutt with Chung. Schutt is actually silent as to the specifics of the etching zone, because Schutt is actually directed to an etching solution having a ferrous ion for etching copper. Further, Chung is directed to a semiconductor wafer clean method and apparatus. As discussed in §2143.01 of the MPEP, “[t]he mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.” *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). Nowhere in the prior art is there any suggestion of the desirability of replacing a spray etcher with a bubble plate. Furthermore, the Examiner asserts that the bubble plate is an alternative and equivalent etching means to the etchant delivery means, however, the Examiner fails to address the fact the bubble plate requires a gas supply which is not disclosed in Schutt. Accordingly, a significant redesign of the system of Schutt would be required in order to accommodate a bubble plate (i.e., the mere replacement of the etching zone with a etch bath is not possible). Further, Schutt is directed to etching copper and more specifically an etching solution to etch copper, and Chung is directed to cleaning semiconductor wafers. These two are directed to completely different problems and fields. Therefore, absent proper motivation to modify the system of Schutt, the rejection of claims 1, 2, 7, 10, 11, 13, 14, 17-22, 25 and 26 is improper.

Kanda and Allies are cited as disclosing control systems for etching apparatuses. They do not disclose or suggest apparatus for etching a glass substrate that includes a first tank, an etch bath and a second tank as claimed.

Because Schutt, Chung, Kanda and Allies each fail to disclose or suggest an etching apparatus for etching a glass substrate that includes a first tank, an etch bath and a second tank as claimed, the combination of these four references cannot possibly disclose or suggest said features. Therefore, even if one skilled in the art were motivated to combine Schutt, Chung,

Kanda and Allies, the combination would still fail to render claim 1 unpatentable for at least the reason that the combination fails to disclose each and every claimed element.

Independent claims 11, 21 and 26 each define an etching apparatus for etching a glass substrate with an etchant that includes, *inter alia*, a first tank, an etch bath, and a second/separation tank which are substantially the same as those recited in claim 1. Therefore, claims 11, 21 and 26 are patentably distinguishable over the combination of Schutt, Chung, Kanda, and Allies for at least those reasons presented above with respect to claim 1.

In addition, claims 2, 7, 13, 14, 17-19, and 25 variously depend from independent claims 1 and 11. Therefore, claims 2, 7, 13, 14, 17-19, and 25 are patentably distinguishable over the combination of Schutt, Chung, Kanda, and Allies for at least those reasons presented above with respect to claim 1.

Independent claim 10 defines an etching apparatus for etching a glass substrate with an etchant. The apparatus includes, *inter alia*, an etch bath receiving the substrate immersed into the etchant, the etch bath etching the glass substrate, wherein the thickness of the glass substrate is uniformly reduced; a temperature sensor installed in the etch bath, the temperature sensor measuring and monitoring a temperature of the etchant; and a control unit controlling the etch bath, the control unit connected to the temperature sensor for receiving a signal indicating a temperature of the etchant to terminate the etching when the temperature of the etchant reaches a termination temperature.

In rejecting claim 10, the Examiner asserts that Kanda discloses a process control system having a thermocouple for measuring the temperature of the etching solution used to etch a submerged substrate. In addition, the Examiner asserts that one skilled in the art would have been motivated to control the etching operation for the etching apparatus of Schutt and Chung with the chemical processing control system of Kanda and Allies in order to detect the termination of etching appropriately and precisely as taught by Kanda by an alternate and equivalent means of detecting said termination in using "reaction energy". These assertions are unfounded for the following reasons.

First, as discussed above with respect to claim 1, the Examiner fails to provide proper motivation of modify the system of Schutt to include an etch bath. Furthermore, nowhere in Schutt is there any suggestion of the desirability of controlling the etching process based on the temperature of the etchant, because Schutt is directed to an etching solution. Accordingly,

absent proper motivation to modify the system of the Schutt, the rejection of claim 10 is improper.

Furthermore, even if, *arguendo*, one skilled in the art were motivated to combine Schutt, Chung, Kanda and Allies as suggested by the Examiner, the combination would still fail to render claim 10 unpatentable because the combination fails to disclose each and every claimed element.

Kanda discloses controlling the etching process based on the thickness of the substrate, which is calculated based on the speed of the etching process, which in turn is based on the temperature of the etchant. The mere fact that Kanda discloses measuring the temperature of the etchant solution is not equivalent to terminating the etching process when the temperature reaches a termination temperature. Nowhere in Kanda is there any disclosure or suggestion of determining a termination temperature, much less terminating the etching process once the termination temperature has been reached.

Because Schutt, Chung, Kanda and Allies each fail to disclose or suggest an etching apparatus that includes a temperature sensor and a control unit for terminating the etching process when the temperature of the etchant reaches a termination temperature, the combination of these four references cannot possibly disclose or suggest this feature. Therefore, even if one skilled in the art were motivated to combine Schutt, Chung, Kanda and Allies the combination would still fail to render claim 10 unpatentable because the combination fails to disclose each and every claimed element.

Independent claim 22 defines an etching apparatus for etching a glass substrate that includes, *inter alia*, a temperature sensor and control unit substantially as recited in claim 10. Furthermore, claim 20 depends from independent claim 10. Accordingly, claims 20 and 22 are patentable distinguishable over the combination of Schutt, Chung, Kanda and Allies for at least those reasons presented above with respect to claim 10.

For at least those reasons present above, Applicant respectfully requests reconsideration and withdrawal of the rejection of claims 1, 2, 7, 10, 11, 13, 14, 17-22, 25 and 26 under 35 U.S.C. §103(a).

Claims 3-6, 8, 9, 12 and 15 variously depend from independent claims 1 and 11. Therefore, claims 3-6, 8, 9, 12 and 15 are patentably distinguishable over the combination of

Schutt, Chung, Kanda and Allies for at least those reasons presented above with respect to claims 1 and 11. Therefore, claims 23 and 24 are patentably distinguishable over the combination of Schutt, Chung, Kanda and Allies for at least those reasons presented above with respect to claims 1 and 11.

Jones discloses an apparatus for automatic chemical processing of semi-conductors. However Jones fails to overcome the deficiencies of Schutt, Chung, Kanda and Allies. Because Schutt, Chung, Kanda, Allies and Jones each fail to disclose or suggest an etching apparatus for etching a glass substrate that includes a first tank, an etch bath, and a second/separation tank as claimed, the combination of these five references cannot possibly disclose or suggest said features. Therefore, even if one skilled in the art were motivated to combine Schutt, Chung, Kanda, Allies, and Jones, the combination would still fail to render claims 3-6, 8, 9, 12, 15, 23 and 24 unpatentable for at least the reason that the combination fails to disclose each and every claimed element.

Claim 16 depends from independent claim 11. Therefore, claim 16 is patentably distinguishable over the combination of Schutt, Chung, Kanda and Allies for at least those reasons presented above with respect to claim 11. Tittle discloses a chemical process control system. However, Tittle fails to overcome the deficiencies of Schutt, Chung, Kanda, and Allies.

Because Schutt, Chung, Kanda, Allies and Tittle each fail to disclose or suggest an etching apparatus for etching a glass substrate that includes a first tank, an etch bath, and a separation tank as claimed, the combination of these five references cannot possibly disclose or suggest said features. Therefore, even if one skilled in the art were motivated to combine Schutt, Chung, Kanda, Allies, and Tittle, the combination would still fail to render claim 16 unpatentable for at least the reason that the combination fails to disclose each and every claimed element. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the rejection of claim 16 under 35 U.S.C. §103(a).

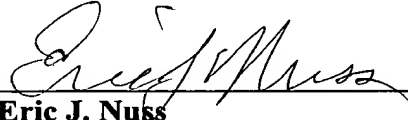
Applicants believe the foregoing remarks place the application in condition for allowance and early, favorable action is respectfully solicited.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at (202) 496-7500 to discuss the steps necessary for placing the application in condition for allowance. All correspondence should continue to be sent to the below-listed address.

If these papers are not considered timely filed by the Patent and Trademark Office, then a petition is hereby made under 37 C.F.R. § 1.136, and any additional fees required under 37 C.F.R. § 1.136 for any necessary extension of time, or any other fees required to complete the filing of this response, may be charged to Deposit Account No. 50-0911. Please credit any overpayment to deposit Account No. 50-0911. *A duplicate copy of this sheet is enclosed.*

Respectfully submitted,

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